

RTU Course "Computer Technologies in Telecommunications"

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General data

Code	RAE601
Course title	Computer Technologies in Telecommunications
Course status in the programme	Compulsory/Courses of Limited Choice
Responsible instructor	Jurģis Poriņš
Volume of the course: parts and credits points	2 parts, 10.0 Credit Points, 15.0 ECTS credits
Language of instruction	LV, EN
Annotation	The relatively new discipline of data mining and data warehouses is most often applied to extraction of useful knowledge from business data. However, it is also useful in some scientific applications where this more empirical approach complements traditional data analysis. The example of machine learning from telecommunications data illustrates this alternative.
Goals and objectives of the course in terms of competences and skills	The course provides the students with the fundamental principles of data mining and data warehousing. A mix of fundamental concepts and recent technologies helps the students to (1) acquire knowledge and skills of data warehousing; (2) become familiar with the algorithms of data mining tasks and (3) gain hands-on experience through a semester-long research project. After this course, students should have general knowledge and skills on how to use the data mining algorithms in practice.
Structure and tasks of independent studies	The teaching methodology will consist of three distinct parts. 1. Interactive lecture. This methodology aims to foster active learning by the students by inviting their involvement in the teaching activities where they can discuss specific issues related to the topics presented by the teacher. 2. Individual Research. Based on such research, the students will prepare presentations. 3. Discussion (seminars). Based on the individual presentation, the teacher and the students will discuss the corresponding research topics and ask questions to the classmates. Paper evaluations that demand critical reasoning will be a part of the grade.
Recommended literature	1. The Data Warehouse Toolkit: The Complete Guide to Dimensional Modeling. 2nd ed. By Ralph Kimball, Margy Ross. John Wiley & Sons, Inc., 2002. 464 p. 2. Kantardzic, Mehmed. Data Mining: Concepts, Models, Methods, and Algorithms. John Wiley & Sons., 2003. 877 p. 3. Pang-Ning, M. Steinbach, V. Kumar. Introduction to data mining. Pearson Education, 2006. 769 p. 4. International Conference on Data Mining: 5th (2009), 4th (2008), 3rd (2007), 2nd (2006), 1st (2005). 5. Y. Peng, G. Kou, Y. Shi, Z. Chen. A Descriptive Framework for the Field of Data Mining and Knowledge Discovery. International Journal of Information Technology and Decision Making, Vol. 7, Issue 4 7, 2008, p. 639–682. doi:10.1142/S0219622008003204
Course prerequisites	Good knowledge of master program concepts

Course contents

Content	Full- and part-time intramural studies		Part time extramural studies	
	Contact Hours	Indep. work	Contact Hours	Indep. work
1.Introduction to the Data Warehouse	16	0	0	0
2.Data Analysis and the Data Warehouse	16	0	0	0
3.Types of Data. Exploring Data	16	0	0	0
4.Data Analysis Scenarios	16	0	0	0
5.Overview of the Data Warehouse Professional Tools	16	0	0	0
6.Knowledge Discovery in Databases (KDD)	16	0	0	0
7.Introduction to Data Mining	16	0	0	0
8.Data Mining Basic Concepts	16	0	0	0
9.Classification	16	0	0	0
10.Association Analysis	16	0	0	0
11.Cluster Analysis	16	0	0	0
12.Anomaly Detection	16	0	0	0
13.Business Data Analysis	16	0	0	0
14.Scientific Data Analysis	16	0	0	0
Total:	224	0	0	0

Learning outcomes and assessment

Learning outcomes	Assessment methods
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Students should be able to identify and discuss the concepts of knowledge acquisition from databases;	- Oral exam, assessment of the research project;
Students should be able to solve the classification problems of telecommunications data by using appropriate software tools;	Oral exam, assessment of the research project;
Students should be able to solve the association problems of telecommunications data by using appropriate software tools;	Oral exam, assessment of the research project;
Students should be able to solve the cluster analysis problems of telecommunications data by using appropriate software tools	Oral exam, assessment of the research project;
Students should be able to solve the anomaly detection problems of telecommunications data by using appropriate software tools;	Oral exam, assessment of the research project;
Students should be able to identify and assess possible research opportunities and difficulties within the framework of the course.	Oral exam, assessment of the research project;
Students should be able to engage in doctoral-level research in this field.	Oral exam, assessment of the research project

Study subject structure

Part	CP	Hours per Week			Tests		
		Lectures	Practical	Lab.	Test	Exam	Work
1.	5.0	4.0	0.0	1.0		*	
2.	5.0	4.0	0.0	1.0		*	